Ninth Guiding Model (Chemistry 2026)

1- (X, Y and Z) are three transition elements used in the medical field.
(X): One of its alloys is used in surgical instruments.
(Y): It is used in artificial joints.
(Z): One of its isotopes is used in the diagnosis and treatment of malignant tumors.
- Which of the following represents the elements (X, Y and Z)?

	(X)	(Y)	(Z)
a)	Chromium	Cobalt	Cadmium
b)	Iron	Titanium	Cobalt
c)	Cobalt	Vanadium	Chromium
d)	Iron	Titanium	Vanadium

2- The following table shows the electronic configuration of the cations of two elements, (X) and(Y)

The cation	The electron configuration
X^{2+}	$_{18}Ar, 3d^4$
Y^{2+}	$_{18}Ar, 3d^2$

-Which of the following is correct?

a) It is difficult to oxidize X^{6+} to X^{7+}
b) It is difficult to oxidize Y^{2+} to Y^{4+}
c) It is easy to reduce X^{6+} to X^{2+}
d) It is easy to reduce Y^{4+} to Y^{3+}

3- (X, Y, Z) three transition elements at the end of the first transition series. Arranged according to atomic mass (Y < Z < X)
-Which of the following represents the correct order of ions of these elements according to the magnetic moment?

a) $Z^{2+} > Y^{2+} > X^{2+}$
b) $X^{2+} > Y^{2+} > Z^{2+}$
c) $Z^{2+} > X^{2+} > Y^{2+}$
d) $X^{2+} > Z^{2+} > Y^{2+}$

4-Which of the following represent the correct order of processes required obtaining a stainless steel alloy from the products of reduction furnace cleaning?

(a) Concentration – Roasting – Reduction –melting with chromium.
(B) Concentration – reduction – roasting –melting with manganese
(C) Sintering – roasting – addition of carbon and chromium – reduction.
(D) Sintering – roasting – reduction – addition of carbon and chromium



5- A transition element (X) with the lowest oxidation state in the first transition series, when chemically combined with another metal to form an alloy.

-Which of the following is true regarding the type of alloy and the use of element X?

a) Substitutional alloy, and (X) is used in the manufacture of soft drink cans.

b) Substitutional alloy, and (X) is used in the manufacture of railway tracks.

c) Intermetallic alloy, and (X) is used in the manufacture of MiG fighter jets.

d) Intermetallic alloy, and (X) is used in the manufacture of coins.

6- When magnesium bicarbonate solution is heated, all of the following are produced except:

a) Another salt of the same acid

b) A gas that oxidizes in air

c) A compound sparingly soluble in water

d) A precipitate that dissolves in dilute acids

7- A solution containing (Ag^{+}, Cu^{2+}, Pb^{2+}, Ca^{2+}) cations .

-Which of the following represents the correct order of steps required to obtain a Solution containing only the copper cation?

a) Add hydrochloric acid – filtration – add hydrogen sulphide gas – filtration

b) Add hydrogen sulphide gas – filtration – add hydrochloric acid – filtration

c) Add sulphuric acid – filtration – add sodium sulphide solution – filtration

d) Add sodium chloride solution –filtration– add magnesium sulphate solution–filtration

8- When adding hot, concentrated sulphuric acid salt (X), fumes are released that Turns a paper wet with starch blue.

-When barium chloride solution is added to salt solution (Y), a white precipitate is Formed that dissolves in dilute HCl.

-Which of the following represents the product of adding silver nitrate solution to Solutions of both (X and Y)?

	In the case of salt solution (X)	In the case of salt solution (Y)
a)	A yellow precipitate forms that dissolves in ammonia solution	A yellow precipitate forms that does not dissolve in ammonia solution
b)	A yellow precipitate forms that does not dissolve in ammonia solution	A yellow precipitate forms that dissolves in ammonia solution
c)	A yellowish white precipitate forms.	A yellow precipitate forms that does not dissolve in ammonia solution
d)	A white precipitate forms that dissolves in ammonia solution	A yellow precipitate forms that dissolves in ammonia solution



9- When 0.2 mol of the anhydrous salt XCl_2 combines with 7.2 g of water, a hydrated salt is formed with the chemical formula $XCl_2 \cdot nH_2O$ (H=1, O=16).

-Which of the following represents the value of (n)?

a) 2 b) 4 c) 6 d) 8

10- When titrating an alkaline solution of concentration (M) with an acid of Concentration (0.5 M), upon reaching the equivalence point, it was found that The volume of acid consumed is equal to the volume of the alkaline solution.

- Which of the following represents the acid and the alkaline solution?

a) Hydrochloric acid and calcium hydroxide
b) Sulphuric acid and potassium hydroxide
c) Hydrochloric acid and potassium hydroxide
d) Sulphuric acid and calcium hydroxide.

11- When equal masses of zinc react with an excess of hydrochloric acid

- Which of the following represents the reaction that produces the greatest volume Of hydrogen gas in the shortest time?

a) A zinc strip with 0.1 M acid at 25°C
b) Zinc powder with 1 M acid at 50°C
c) Zinc powder with 0.1 M acid at 25°C
d) A piece of zinc with 1 M acid at 50°C

12- The following equilibrium reaction in a closed vessel:

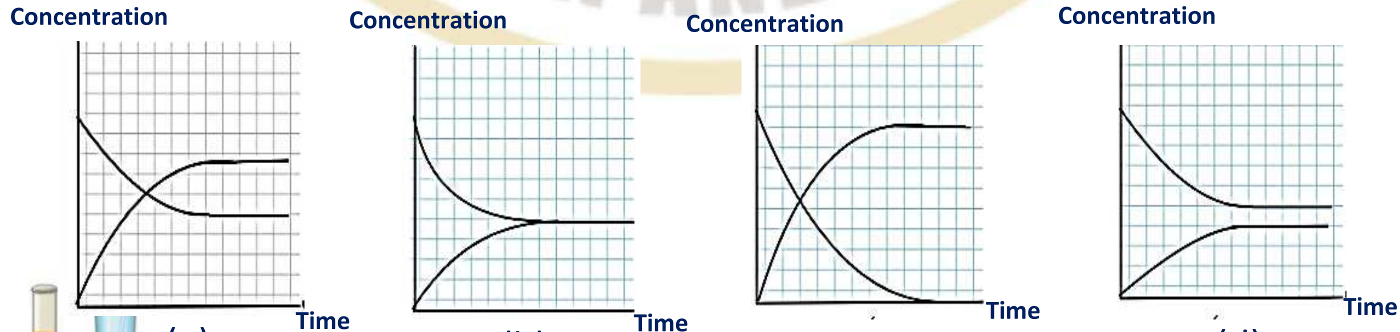
$$2A_2X_{(g)} + XY_{2(g)} \rightleftharpoons 3X_{(s)} + 2A_2Y_{(g)} \quad , \quad \Delta H < 0$$

(Yellow)

-Which of the following is true?

(a) Adding more of substance (X) shifts the equilibrium backward
(b) When the container is placed in a cooling mixture, the partial pressure of Gas XY_2 increases
(C) The mass of the precipitate increases by increasing pressure
(d) The volume of A_2Y decreases as the volume of the container decreases

13- Which of the following diagrams represents the relationship between the concentrations of products and reactants when a piece of magnesium metal is placed in a dilute sulfuric acid solution? (C)



(a) (b) (c) (d)

14- When a solution of a weak monoprotic acid is diluted by adding water, doubling its volume:

Which of the following happens to the value of α and the pH?

a) The value of α decrease and becomes (1/1.414 α), and the pH of the solution decreases.

b) The value of α increase and becomes (1.414 α), and the pH of the solution increases.

c) The value of α doubles, and the pH of the solution increases.

d) The value of α is halved, and the pH of the solution decreases.

15- If the Ksp value of AgCl salt is 1.6×10^{-10}, then the mass of the salt dissolved in 50 mL of water is: (AgCl = 143.5 g/mol)

a) 1.6×10^{-10} g
b) 0.905×10^{-4} g
c) 1.26×10^{-5} g
d) 1.81×10^{-4} g

16- In the following equilibrium reaction: $2NO + O_2 \rightleftharpoons 2NO_2$

- Which of the following describes what happens in this case?

a) NO and O_2 react in equal mass proportions.

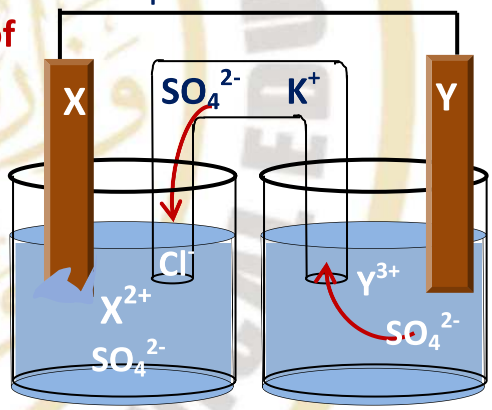
b) The rate of formation of NO_2 is twice the rate of consumption of O_2.

c) The rate of consumption of O_2 is equal to the rate of formation of NO_2.

d) At equilibrium, the volumes of the reactants and products are equal.

17- The figure opposite shows a galvanic cell consisting of two electrodes. (X, Y):

-Which of the following represents the total reaction of the cell?



a) $X_{(s)} + Y^{3+}_{(aq)} \rightarrow X^{2+}_{(aq)} + Y_{(s)}$

b) $Y_{(s)} + X^{2+}_{(aq)} \rightarrow Y^{3+}_{(aq)} + X_{(s)}$

c) $2X_{(s)} + 3Y^{3+}_{(aq)} \rightarrow 2X^{2+}_{(aq)} + 3Y_{(s)}$

d) $3X_{(s)} + 2Y^{3+}_{(aq)} \rightarrow 3X^{2+}_{(aq)} + 2Y_{(s)}$

18- Which of the following reactions represents a non-spontaneous reaction that occurs at the anode of an electrolytic cell?

a) $Br_2 + 2e^- \rightarrow 2Br^-$

b) $Cu^{2+}_{(aq)} \rightarrow Cu_{(s)} - 2e^-$

c) $4OH^-_{(aq)} \rightarrow O_{2(g)} + 2H_2O_{(l)} + 4e^-$

d) $2H_2O_{(l)} + 2e^- \rightarrow H_{2(g)} + 4OH^-_{(aq)}$

19- A galvanic cell (X) consists of two electrodes (A, B), and electrons flow through the external wire from (B) to (A).

-An electrochemical cell (Y) consisting of the same electrodes undergoes the following reaction: $A_{(s)} + B^{2+}_{(aq)} \rightarrow A^{2+}_{(aq)} + B_{(s)}$

-Which of the following options describes cell (Y)?

(a) Galvanic with positive (emf) , electrode (A) is negative and acts as an anode

(b) Galvanic with a positive (emf) , electrode (B) is positive and acts as a cathode

(c) Electrolytic with a negative (emf) , electrode (A) is negative and acts as an anode

(d) Electrolytic with a negative (emf) , electrode (B) is negative and acts as a cathode

20- The opposite diagram shows a water tank connected to a pipe and tap made of three metals (X, Y, Z), with reduction potentials as follows: (X = -0.40 V, Y = +0.3 V, Z = -2.71 V). The pipe acts as a scarifying electrode for both the tank and the tap, and the material of the tap provides cathodic protection for the tank under normal conditions.



-Which of the following represents the metals from which each is

	Tank	Tap	Pipe
a)	Y	X	Z
b)	X	Y	Z
c)	X	Z	Y
d)	Z	Y	X

21- A copper rod containing iron and silver impurities was purified using electrolytic cell.

-Which of the following represents the change in electrode masses after a period of time of the passage of electric current?

a) The decrease in anode mass equals the increase in cathode mass.cell

b) The decrease in anode mass is less than the increase in cathode mass.

c) The decrease in anode mass is greater than the increase in cathode mass.

d) The decrease in anode mass equals the mass of the undissolved impurities.

22- Which of the following is correct for both a fuel cell and a mercury cell?

a) Both are cells that convert stored chemical energy into electrical energy.

b) Reduction occurs in both at the negative electrode.

c) The components of both cells are consumed during operation.

d) Both are alkaline cells, and the electrolyte concentration does not change during operation.

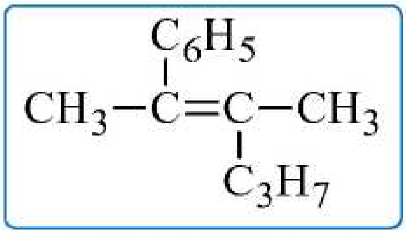
23- (X, Y) are two salts of organic acids with the following chemical formulas:
X: $(HCOO)_2Ca$
Y: $(COO)_2Ca$
Which of the following choices expresses the number of moles of organic acid and base required to prepare one mole of each of the two salts (X and Y)?

a) X: 1 mol of oxalic acid and 2 mol of calcium hydroxide
Y: 1 mol of formic acid and 1 mol of calcium hydroxide
b) X: 2 mol of formic acid and 2 mol of calcium hydroxide
Y: 1 mol of oxalic acid and 1 mol of calcium hydroxide
c) X: 2 mol of oxalic acid and 2 mol of calcium hydroxide
Y: 1 mol of formic acid and 1 mol of calcium hydroxide
d) X: 2 mol of formic acid and 1 mol of calcium hydroxide
Y: 1 mol of oxalic acid and 1 mol of calcium hydroxide

24- Which of the following represents a compound that don't decolorizes bromine Dissolved in carbon tetrachloride?

(a) The product of dropping of water on calcium carbide
(b) The product of the catalytic reforming of hexane
(c) The product of adding concentrated sulphuric acid to propanol at 180°C
(d) The product of strong heating followed by rapid cooling of the dry Distillation product of sodium acetate

25-Which of the following is the IUPAC name of the corresponding compound?



a) 3-propyl-2-phenyl-2-butene
b)2 ,3-dimethyl-4-phenyl-3-pentene
c) 3,4-dimethyl-2-phenyl-2-pentene
d) 2-phenyl-3-methyl-2-hexene

26- Upon hydrolysis in an acidic medium for propyl benzoate an acidic compound (X) is produced. When compound (X) reacts with the simplest aliphatic alcohol, compound (Y) is produced. Which of the following is the isomer of compound (Y)?

a) Phenyl formate
b) Butyl formate
c) Phenyl acetate
d)P henyl benzoate

27- From the following diagram:

(X) : C_3H_5Cl $\xrightarrow{\text{Hydrogenation}}$ Y $\xrightarrow{\text{Alkaline hydrolysis}}$ Z

-Which of the following represents the number of isomers for each formula of (X,Y,Z)?

	Number of Isomers of (X)	Number of Isomers of (Y)	Number of Isomers of (Z)
(a)	3	3	3
(b)	4	2	2
(C)	2	2	2
(d)	4	3	2

28- (X): A primary alcohol with one alcoholic isomer

(Y): A hydrocarbon produced by the dehydration of compound (X)

(Z): An isomer of compound (Y)

- Which of the following represents the properties of compound (Z)?

a) More stable than normal propane

b) Burns faster than cyclic butane

c) Burns slower than normal hexane

d) Less reactive than cyclic pentane

29- Two organic compounds (X, Y), compound (X) has the formula $C_2H_6O_2$, while compound (Y) has the formula $C_2H_4O_2$. Which of the following is correct?

a) Both react with sodium hydroxide

b) Both react with halogenated acids

c) Both are oxidized by potassium permanganate solution

d) When they react together, an ester is formed

30- Two organic compounds (A, B) are open-chain hydrocarbons.

- Burning one mole of compound (A) produces 3 moles of CO_2

- Burning one mole of compound (B) produces 5 moles of H_2O

If you know that (A) undergoes a substitution reaction while (B) undergoes an addition reactions in a one step, then:

a) (A) is a gaseous alkane, (B) is a liquid alkane

b) (A) is a liquid alkane, (B) is a liquid alkene

c) (A) is a gaseous alkane, (B) is a liquid alkene

d) (A) is a gaseous alkene, (B) is a liquid alkyne



31- Compounds (A) and (B) are prepared by nitration, where:

(A): is prepared by nitration of an aromatic hydrocarbon.

(B) : is prepared by nitration of an aromatic hydrocarbon derivative.

Which of the following represents compounds (A) and (B)?

(a) (A) : Meta-nitro-toluene , (B): Meta-nitro benzoic acid

(b) (A) : 4-Nitro-toluene , (B) : 3-Nitro benzoic acid

(C) (A) : Ortho-nitro-toluene , (B) : 2-nitro benzoic acid

(d) (A) : 2-nitrotoluene , (B): para-nitro benzoic acid

32- Three organic compounds (X, Y and Z) have the molecular formulas:

(X): C_2F_4

(Y): $C_2H_4O_2$

(Z): CCl_2F_2

-Which of the following correctly represents each compound?

	Compound (X)	Compound (Y)	Compound (Z)
a)	Alkene derivative: Used as a raw material in the lining of cooking utensils.	Aliphatic acid: Used in the manufacture of synthetic silk.	Alkane derivative: Used as a Cooling agent.
b)	Alkane derivative: Used in surgical threads.	Aromatic acid: Used as a food preservative.	Alkene derivative: Used as a cleaner of electric sets.
c)	Alkane derivative: Used as a raw material in the lining of cooking utensils.	Aliphatic ester: Used as a Flavor and Oduor enhancers	Alkane derivative: Used as rushed substance for liquids.
d)	Alkene derivative: Used in the manufacture of plastics.	Aliphatic acid: Used in the manufacture of explosives.	Alkene derivative: Used as an insecticide.

33- (A, B) are iron (II) salts and the thermal decomposition of each in absence Of air give an iron oxide, as shown by the following equations:

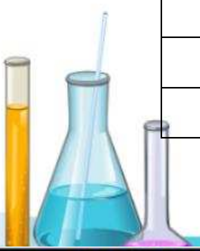
$$A_{(s)} \xrightarrow{\Delta} C_{(s)} + D_{(g)} + E_{(g)}$$

$$B_{(s)} \xrightarrow{\Delta} G_{(s)} + L_{(g)} + M_{(g)}$$

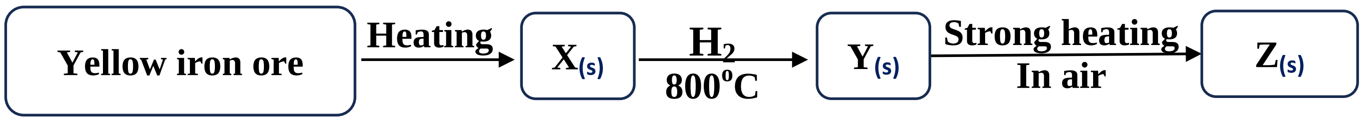
The gas (M) is used in the production of sulphuric acid.

-Which of the following represents A, B, C, and G?

	A	B	C	G
a)	$(COO)_2Fe$	$FeSO_4$	FeO	Fe_2O_3
b)	$Fe(OH)_3$	$FeCO_3$	Fe_2O_3	FeO
c)	$(COO)_2Fe$	$FeSO_4$	Fe_2O_3	FeO
d)	$FeCO_3$	$Fe(OH)_3$	FeO	Fe_2O_3



34- The following diagram represents the reactions of iron compounds:



- Which of the following represents the chemical formulas of (X, Y and Z)?

	X	Y	Z
a)	Fe_2O_3	Fe	Fe_3O_4
b)	Fe_3O_4	FeO	Fe_2O_3
c)	Fe_2O_3	FeO	Fe_3O_4
d)	FeO	Fe	Fe_2O_3

35- 12 g of a mixture of potassium chloride and potassium carbonate salts were dissolved in water. An excess amount of magnesium sulphate solution was added to the solution, a precipitate is formed with a mass of 5 g.
Which of the following represents the percentage of potassium chloride in the mixture? (K=39, C=12, O=16, Mg=24)

a) 35.44%
b) 68.45%
c) 31.55%
d) 40.91%

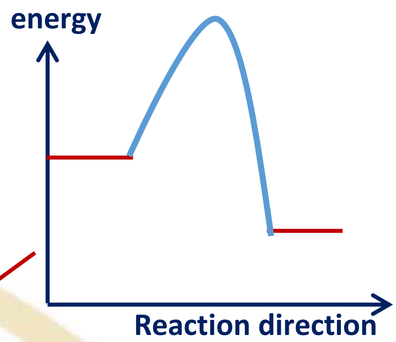
36- The following equation represents the reaction that occurs between nitric Oxide and hydrogen under certain conditions:

$$2NO_{(g)} + 2H_{2(g)} \rightleftharpoons N_{2(g)} + 2H_2O_{(v)}$$

-If 0.1 mol of nitric oxide is mixed with 0.05 mol of hydrogen in a 1 L closed container at a certain temperature. At equilibrium the number of moles of (NO) in the container is found to be 0.062 mol.
Which of the following represents the value of Kc for this reaction at the same temperature?

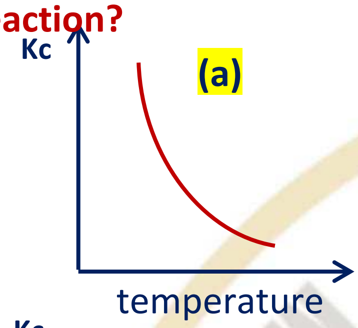
a) 1.86
b) 3.13
c) 49.56
d) 94.62

37- The opposite figure shows the energy diagram for a reversible reaction at equilibrium:

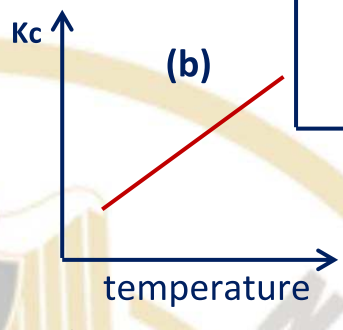


- Which of the following graphs represents the Relationship between K_c and temperature for this reaction?

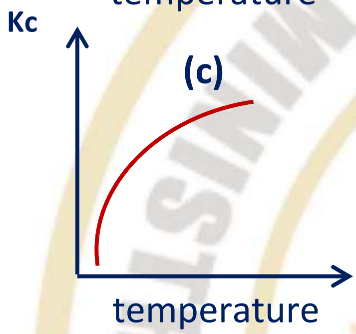
(a)



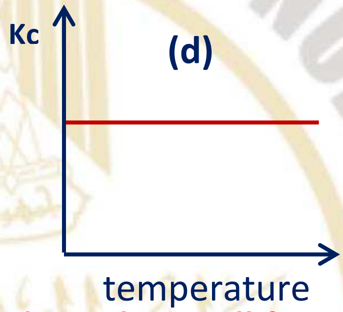
(b)



(c)



(d)



38- A metal is connected to the cathode of an electrolytic cell for plating with chromium metal using an acidic electrolyte solution containing $Cr_2O_7^{2-}$ ions.
(If you know that oxygen gas is released at the anode of this cell)
-Which of the following represents the number of moles of gas released when the mass of the metal to be plated is increased by 151g? [Cr=52, O=16]

a) 4.36
b) 0.726
c) 17.4
d) 3.86

39- The following table shows the standard electrical potentials of four elements:

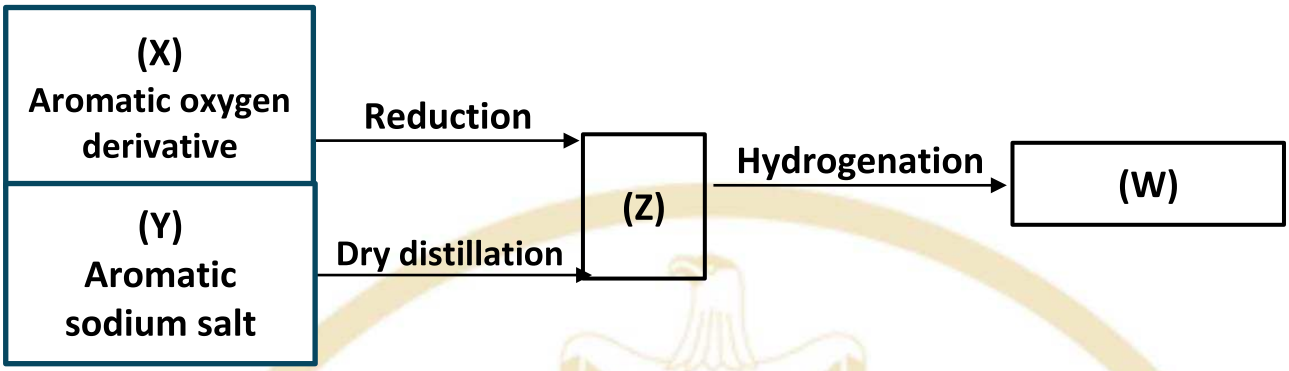
The element	$A^{2+} + 2e^- \rightarrow A$	$B \rightarrow B^{2+} + 2e^-$	$C^{2+} + 2e^- \rightarrow C$	$D \rightarrow D^{2+} + 2e^-$
E^o	-2.71 V	+0.40 V	+0.80 V	-1.20 V

Which of the following represents the number of galvanic cells that can be formed from these elements, and the highest value of emf that can be obtained?

a) 4 cells, emf = 1.60 V
b) 6 cells, emf = 3.91 V
c) 6 cells, emf = 3.11 V
d) 12 cells, emf = 3.51 V



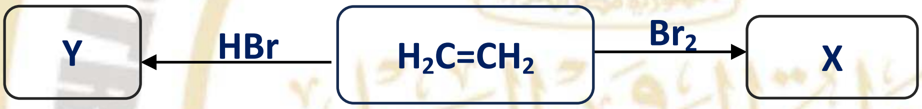
40- From the following diagram:



- Which of the following is correct?

a) (Y) Ortho methyl sodium benzoate, (X) Ortho methyl phenol, (W) Cyclohexane.
b) (Y) Para methyl sodium benzoate, (Z) Methyl benzene, (W) Cyclohexane.
c) (X) Para methyl phenol, (Z) Methyl benzene, (W) Methyl cyclohexane.
d) (X) Phenol, (Y) Ortho methyl sodium benzoate, (W) Methyl cyclohexane.

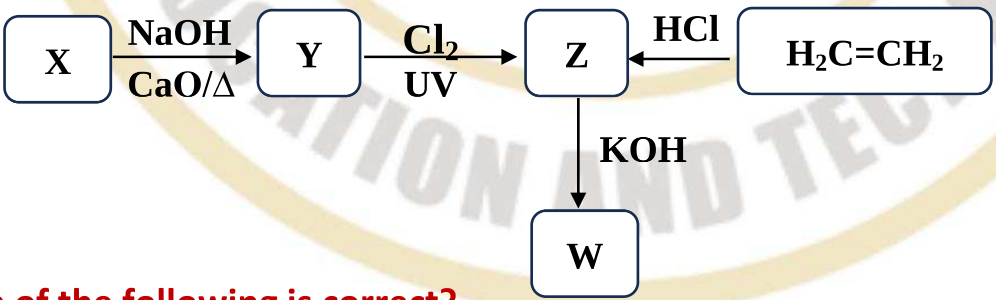
41- From the following diagram:



-When an abundance of KOH is added to both Y and X, which of the following represents the compound produced in each case?

a) In case of X: a secondary alcohol is produced, used in thermometers.
b) In case of Y: a secondary alcohol is produced, used as a sterilizing of mouth &tooth.
c) In case of X: a primary alcohol is produced, which is a monomer of PEG.
d) In case of Y: a primary alcohol is produced, used in pen inks.

42- From the following diagram:

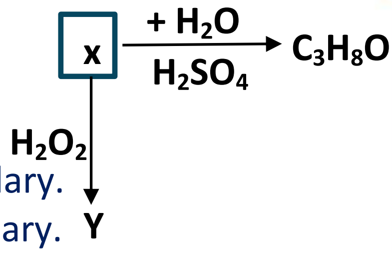


Which of the following is correct?

a) X : is sodium ethanoate , W: is a secondary alcohol.
b) X : is sodium propanoate , W: is a primary alcohol.
c) X : is sodium ethanoate , W: is a primary alcohol.
d) X : is sodium propanoate , W: is a secondary alcohol.

43- The following reaction took place under suitable conditions:

Which of the following is correct?



a) Both (Y) and C_3H_8O contain a secondary carbinol group.

b) Both (Y) and C_3H_8O contain a primary carbinol group.

c) The carbinol group in C_3H_8O is primary, while in (Y) it is secondary.

d) The carbinol group in C_3H_8O is secondary, while in (Y) it is tertiary.

44- You have the following organic compounds:

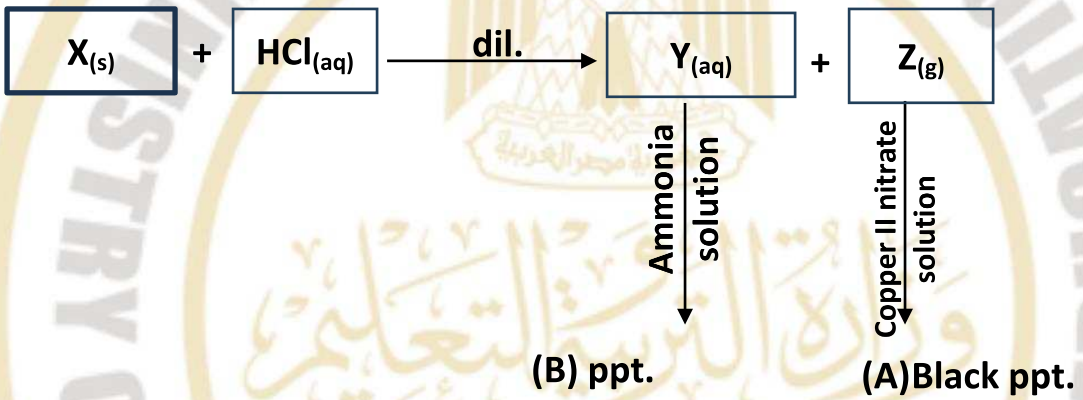
(X: C_7H_8) **(Y: C_6H_6O)** **(Z: $C_7H_6O_2$)** **(L: $C_6H_{14}O_6$)**

-The compounds that react with NaOH are:

a) X and Y only b) Y and Z only c) Y and L only d) Y, Z, and L only

Essay Questions:

45- The following diagram represents the chemical reactions of some salts:



The precipitate (B) is white; it turns greenish white upon expose to air

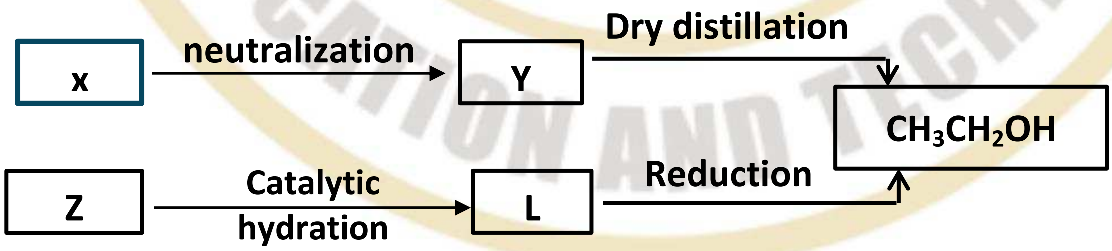
- **Write the chemical formulas for each of the following:**

1-Salt (X): ……………………………………

2-Salt (Y): ……………………………………..

-Write the chemical names of precipitates (A) and (B):

46- The following diagram represents some reactions in organic compounds:



1-State the IUPAC name of the isomer of the compound from adding formed Excess of HBr to compound (Z)

2- State the IUPAC name of the product from the reduction of compound (X)

3- Write the structural formulas for compounds (Y) and (L)

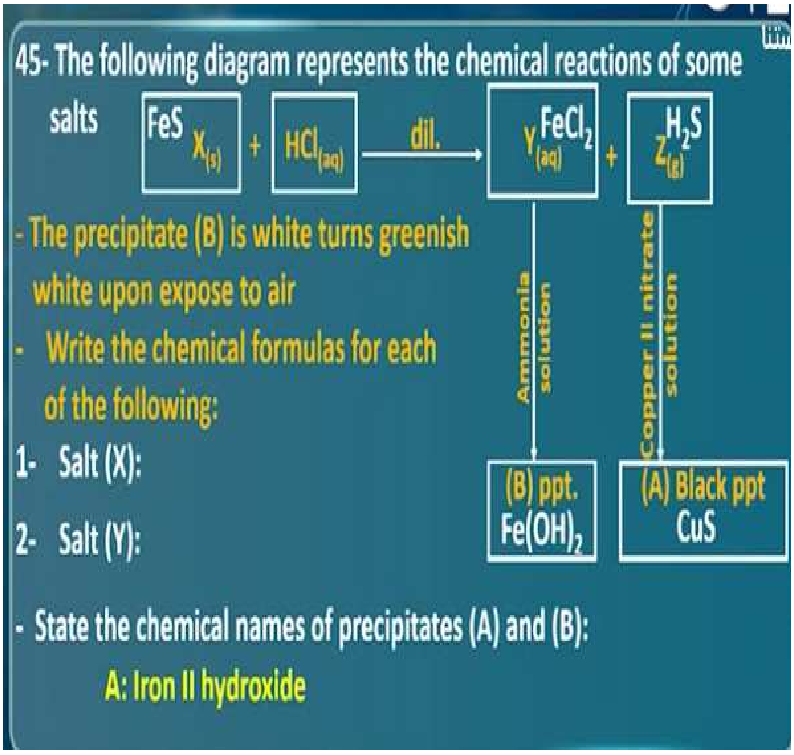
اجابه الامتحان الاسترشادي التاسع كمياء لغات انجليزي 2026 موقع الدكتور محمد رزق التعليمي	
الاجـــــــــابة	رقم السؤال
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D	7
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A	9

B	10
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C	12
C	13
B	14
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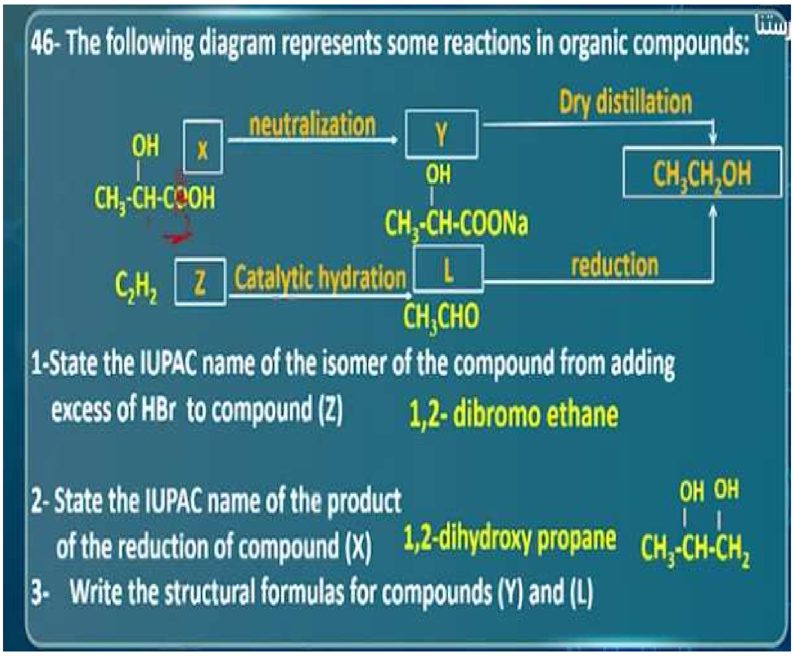
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B	28
D	29
C	30
B	31
A	32

A	33
A	34
C	35
C	36
A	37
A	38
B	39
C	40
C	41
B	42
A	43
B	44

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تم الاجابه من خلال موقع الدكتور محمد رزق التعليمي

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